RE/MAKING "ENGAGEMENT AND LEARNING NEEDS:" CITATION MAPPING FOR FIELD ANALYSIS IN MATHEMATICS EDUCATION RESEARCH

Christopher H. Dubbs
East Stroudsburg University
cdubbs@esu.edu

Susan O. Cannon
University of Georgia
cannonso@uga.edu

We used citation cartography to answer the question, "what research agendas should we pursue, with respect to engagement and learning needs, to ensure that all students reach their potential?" First, we found that current research studying engagement and learning needs were located on the periphery of the field with few connections between (1) these needs, (2) research related to race, gender, and social justice mathematics, and (3) research related specifically to mathematics content areas. We, thus, conclude with two recommendations for the field. First, we advise that mathematics education researchers consider how we might more fully connect distant subfields in mathematics education research. Second, we highlight the potential of making connections to fields outside of mathematics education. We believe that these two moves will help ensure all students reach their potential by having their engagement and learning needs met.

Keywords: Research Methods, Systemic Change, Reflexivity

Introduction

In this research report we seek to outline a tentative answer to one of the conference theme questions: "What research agendas should we pursue to ensure that all students reach their potential by paying attention to engagement and learning needs?" From our perspective, it is necessary to first answer the question: "What research agendas *are we pursuing* to ensure that all students reach their potential by paying attention to engagement and learning needs?" That is, before we can provide evaluative judgment and recommendations on which agendas *ought* to be pursued, it is necessary to provide a sketch of which agendas *are* being pursued. To be explicit, then, our objective is (1) to outline what existing research agenda/foci are being undertaken that relate to students' "engagement and learning needs" before (2) sharing our recommendations for potential paths forward for the field to engage in research that ensures all students reach their potential.

To provide such a sketch, we draw on the citation network analysis presented in *The Mathematics Education Atlas* (Dubbs, 2021) and the citation network map of the *Journal for Research in Mathematics Education* (*JRME*) in the 2010s. This bibliographic mapping provides a literal view of the landscape of mathematics education research and the research foci that mathematics education researchers (MERs) have studied/are studying as a field. By critically reading the *JRME* map, we isolated those research foci which center around "student engagement and learning needs" and consider their relations to the field at large. To wit, we found that research related explicitly to children's learning needs were located on the periphery of the map and that there are few connections between students' learning needs, research related to race, gender, and social justice mathematics, or research related specifically to mathematics content areas. Thus, we argue that it is necessary for MERs to make kin (Haraway, 2016) in lines of inventive connections between these subfields (what we will call bubbles) in mathematics education research in order to ensure all students reach their potential.

Lamberg, T., & Moss, D. (2023). *Proceedings of the forty-fifth annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education* (Vol. 2). University of Nevada, Reno.

Theoretical Framework: Alchemical Combinations for Becoming and Re/making

> In chemistry, we get different products depending on which substances are combined in what quantities under which conditions. Foucault's theory of power-knowledge is something like that. We get different products of knowledge depending on which beliefs are combined with what societies under which political conditions. (Fendler, 2010, p. 53)

In addition to our researcher positionality (Foote & Bartell, 2011), the societies in which we exist, the perspective whence we observe, the theories we employ, and the data we analyze each influence the conclusions we draw. This is fundamentally an illustration of the alchemy implied by Foucault's power-knowledge. Thus, it is important that we explicitly name which theories frame our present investigation. First, we presume that the researcher and the field are both in a state of *becoming* (e.g., Barad, 2007; Cannon, 2020b). In short, neither a researcher nor the field are ever final, accomplished, or fixed and the ways that both *become over time* are entangled. Second, we presume that the researcher can take the field as their object and remake it (Rancière, 2009), remake it with care *à la* an artist creating, a farmer tending, or a doctor healing (Foucault, 1984). Other researchers might productively adopt alternative perspectives to produce alternative knowledges: equally valid products resulting from differences in substance combination and quantity. We elaborate the explicit connection between our theories and research questions now.

Field Becoming: Re/con/figuring Mathematics Education Research

According to Cannon's theory of field becoming, in the process of disciplining ourselves to be recognized as MERs (e.g., reading from, citing, and writing for particular journals), we are conditioned by the norms and expectations outlined by the field (Cannon, 2020b). We seek the normative delimiters and boundaries that outline which sorts of research are "sensible and legitimate." Simultaneous with our own becoming, the field of mathematics education research is also *becoming*: there is disagreement about what constitutes legitimate research (e.g., Heid, 2010; Herbst et al., 2022), the field has studied shifting foci across time (Inglis & Foster, 2018; Dubbs, 2021), and "we create the field, we work the ground, we discipline ourselves and the field" (Cannon, 2020b, p. 1115). Thus, there is mutual re/con/figuring at work: scholars re/con/figure themselves by obeying or transgressing the ways of being and doing prescribed by the field, and the field is re/con/figured as scholars do work that preserves or perturbs the present state of the field.

If "each piece of writing or conversation or body carried into a particular space and how it is received in that space matters for how the field continues to become" (Cannon, 2020b, p. 1115) then it is important as researchers that we understand how the current configuration of the field positions research on "engagement" and "learning needs." In other words, if the foci and methods of current research make research with similar foci and methods seem more sensible (Parks & Schmeichel, 2012), it is necessary to first discern the ways we conduct and write about research that considers "engagement and learning needs," to know what ways of doing such research will be easiest to imagine. It is this argument that brings us to our first research question [RQ1]: "What research agendas *are we pursuing* as a field to ensure that all students reach their potential by paying attention to engagement and learning needs?"

We must take seriously that this mutual becoming is an *ethical* matter (Cannon, 2020b). In the process of constituting oneself as a proper subject of mathematics education research (Foucault, 1984), one must negotiate their subjectivity, there is room for innovation but not without constraint (Cannon, 2020b). In other words, if the ways that someone can conduct new research are in some ways bound to the ongoing ways of doing mathematics education research–as evidenced by

published studies, etc.–the ways that a mathematics education researcher might take up research on "engagement" and "learning needs" will be (de)limited by what *has been done*.

Field Remaking: Sociopolitical Aesthetics of Mathematics Education Research

> Mathematics education research, as a field, is worthwhile insofar as we continue to change. The instant we draw a line…we lose the game. (Dubbs, 202, p. 165)

After answering RQ1, thereby discussing "engagement and learning needs" field *as it is*, we turn to our second research question [RQ2], imported from the conference questions, to ask: "What research agendas should we pursue to ensure that all students reach their potential by paying attention to engagement and learning needs?" Reminding ourselves that the state of things is not justification for what ought to be (Hume, 1739), we have a critical eye towards those bubbles of research identified in RQ1. We argue that the *existence* of these ways of doing mathematics education research in the name of "engagement and learning needs" is not a sufficient warrant that these ways of doing this research *ought* to be that way—a separate ought-argument is necessary. In other words, our second question is fundamentally about changing the field, about remaking the field *as it ought to be*.

It is easier to imagine a change in the field, if we consider that "change is the result of a thousand creeping encroachments" (Rancière, 2000, para. 8). That is, the field can change by way of numerous small suggestions on what *should be done,* numerous small ways of *doing things differently*, and numerous small ways of *asking different questions*. Unlike attempts to establish fixed borders (e.g., Heid, 2010), we combine the perspectives of Cannon (2020a) and Dubbs (2021) to endorse a perspective of mathematics education research that is predicated on perpetual change and re/con/figuration. By desiring certitude, borders harden toward difference. It is not our role as the authors to define proper "engagement and learning needs research," it is the field's role to continually re/con/figure it. This article constitutes our initial re/con/figuration.

Since a researcher's and the field's becoming are entangled (Barad, 2007), it is helpful to think of remaking the field of mathematics education research as a sociopolitical aesthetic project. In other words, our project is the sociopolitical aesthetics of mathematics education research: *sociopolitical* in the sense that mathematics education research is a social endeavor wherein competing visions for what mathematics education research *ought* to consider (cf. Gutierrez, 2013), and *aesthetic* in that we are interested in what we can see, say, think, and do as sensible mathematics education research (cf. Rancière, 2009). Further, the research we ultimately undertake will influence both our own and the field's *becoming*, the future of the field is of ethical concern (Dubbs, 2020)–echoing the ethical matter of subjectivity raised by Cannon.

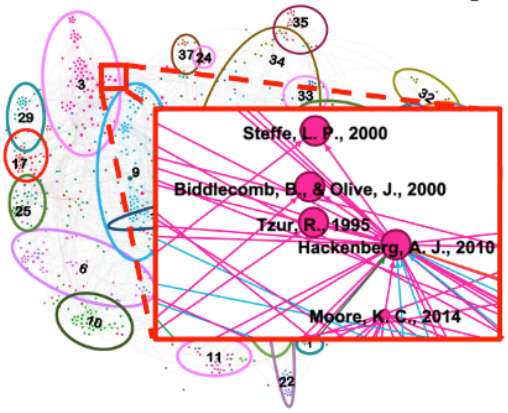
Citation Network Methods: Using Graph Theory to Study Knowledge Production

Citation networks can be considered maps of the field of mathematics education research (Dubbs, 2021). Dubbs mapped the complete citation relationships of articles published in the *Journal for Research in Mathematics Education* (*JRME*) from the 1970s to the 2010s, in *Educational Studies in Mathematics* in the 2010s, and *For the Learning of Mathematics* in the 2010s. Choosing these journals due to their prominence in the field (e.g., Nivens & Otten, 2017), Dubbs showed that (1) mathematics education research has not had a fixed focus of study across time (he warrants this through the shifts he identifies in focus across five decades of research in the *JRME*) and (2) mathematics education research does not currently have a proper singular object of study (he warrants this via the plural foci under consideration within and across the three journals during the 2010s). Our interest, hence, diverges with Dubbs here. While Dubbs sought to identify and describe the structure of much of mathematics education research, our interest is in reading one

map (the *JRME* 2010s) to identify how the field has talked about "engagement and learning needs," and to propose, if necessary, alternative futures.

Dubbs' research maps (2021) use circles, called nodes, to represent articles and their references. Each node is labeled with its APA-style author and year (e.g., Hackenberg, A. J., 2010) to identify which article/reference it represents. See in Figure 1, for example, an enlarged portion of Bubble 3 (Children's Learning) from Dubbs' *JRME* 2010s map. In Figure 1, one can see that some nodes are connected with an arrow, called an edge. Edges correspond to citations and arrow direction indicates which article cites which. Notice, for example, that Hackenberg, 2010 (in Figure 1) has both *outgoing* arrows (i.e., it *cites* Steffe, 2000) and *incoming* arrows (i.e., it is *cited by* Moore, 2014)). To quickly see relative uptake (i.e., citation count), node size is proportional to the number of times the reference is cited: more cited articles have larger nodes.

Figure 1: An enlarged portion of Bubble 3 of the JRME 2010s map to show graph details.



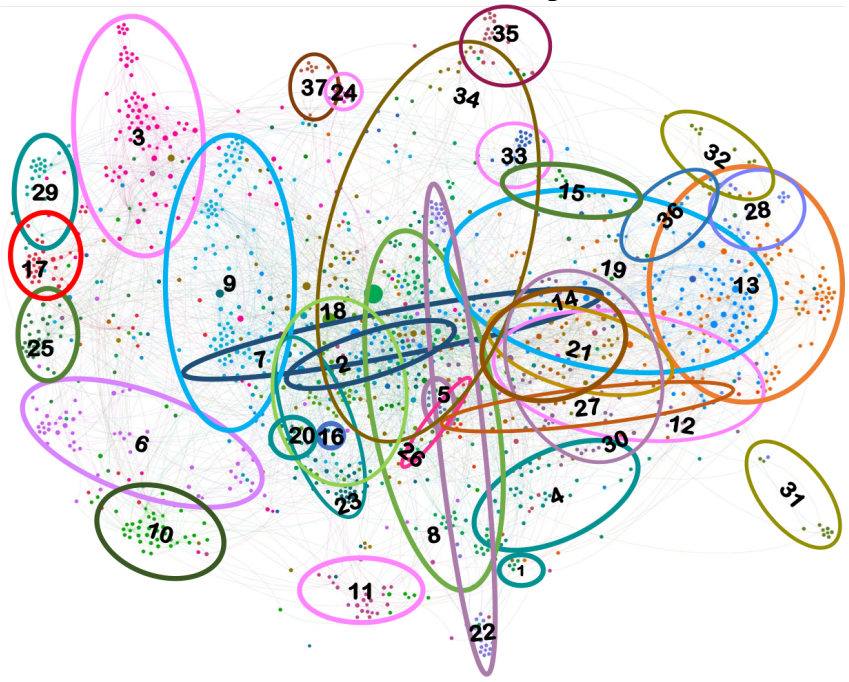
Bifocal Results: Macro- and Micro-views

To answer the question, "What research agendas *are we pursuing* to ensure that all students reach their potential by paying attention to engagement and learning needs?," we critically read the *JRME* 2010s map. Dubbs identified 37 bubbles (see Figure 2's note for the name of each of the 37 bubbles), corresponding to delineated areas of focus within the research published in the *JRME* during the period from January 2010 to November 2019 (*JRME 41*(1) to *JRME 50*(5)). First, we considered which of these bubbles most directly related to students' engagement and learning needs. The two most salient bubbles are: Bubble 3 (Children's Learning) and Bubble 17 (Children's Achievement, Intervention, & Trajectories). In this section, first, we consider the relative position of these two bubbles within the 2010s map before turning to a more detailed analysis of the overlap and connections between these bubbles and the remainder of the map.

Macroanalysis: Position of Focal Bubbles Relative to the Map

Consider the left-hand side of Figure 2. The first focal bubble, Bubble 3 (Children's Learning), is located on the periphery of the map and only intersects with one other bubble, Bubble 9 (Mathematics Knowledge for Teaching). Bubble 3 is adjacent to Bubble 29 (Learning Disabilities), and the other focal bubble, Bubble 17 (Children's Achievement, Intervention, and Trajectories). Bubble 3 has 99 nodes (i.e., articles/references), 429 outgoing edges (i.e., citations *to* the rest of the field), 178 internal edges (i.e., citations *within* the bubble), yet only 49 incoming edges (i.e, citations *by/from* the rest of the field). This imbalance suggests that while the articles within Bubble 3 seem to both (1) cite within the bubble a sufficient number of times

Figure 2: The 37 bubbles of research that comprise the *JRME* 2010s map.



Note: Dubbs' (2021) 37 bubbles for the JRME *in the 2010s are: (1) Proof and Argument, (2) Professional Development, (3) Children's Learning, (4) Mathematical Discourse, (5) Schoenfeld, (6) Meaning of Equality, (7) Teaching's Influence on Learning, (8) Proof and Reform, (9) Mathematics Knowledge for Teaching, (10) Negative Numbers, (11) Limits and Calculus, (12) Culturally Relevant Mathematics African American & Indigenous, (13) Racial Identity & Success, (14) English Language Learner's Identity & Participation, (15) Achievement Gap, (16) Sociocultural Learning, (17) Children's Achievement, Intervention, & Trajectories, (18) Mathematics Curriculum, (19) Equity and Social Justice, (20) Math Achievement, (21) Mathematics Identity, (22) Proof in RUME, (23) Mathematics Teachers and Teaching, (24) Empirical Statistics, (25) Algebra, (26) Problem Posing and Multiple Solutions, (27) Racialized Mathematics Achievement Remediation, (28) Qualitative Metasynthesis, (29) Learning Disabilities, (30) Learning in Contexts, (31) Research on Research, (32) Gender and Achievement, (33) Urban Equity and Technology's Role, (34) Sociological Perspectives on Learning, (35) Psychological Studies & Replication, (36) Girls' Identities, and (37) Research in Undergraduate Mathematics Education.*

to establish a cohesive bubble and (2) cite outside Bubble 3 sufficiently to anchor their work to the rest of the field, they are not sufficiently cited by the rest of the field to situate it more centrally.

Relative to the entire map, both Bubbles 3 (Children's Learning) and 17 (Children's Achievement, Intervention, & Trajectories) are located on the far left of the map and are isolated from the center of the map. Since the bubbles centrally located correspond to the areas of focus for the journal during this decade, this separation and isolation is noteworthy and indicates that the field is only tangentially pursuing research related to students' engagement and learning needs. These areas of research are not integrated into the *central* topics that are published by the journal. We consider the implications of this distance and disconnect in our final section.

Microanalysis: Focal Bubbles' Connections to the Map

Within Bubble 3, articles on Wilkins and Norton's quantitative studies on splitting operations and fraction schemes anchor this bubble (e.g., their 2011 article is the most cited article in Bubble 3; see also, Norton & Wilkins, 2012, 2018) with their large number of incoming and outgoing citations (i.e., also the number of references they cite). Thus, anyone *becoming* with the field of

mathematics education research–be they a MER, graduate student, or scholar outside of mathematics education research–that is reviewing the literature published on children's learning in the *JRME* during the 2010s (esp. Bubble 3), would glean particular norms about the focus: quantitative, constructivist, studies on children's understanding of specific mathematical concepts. In other words, *becoming* a researcher of children's learning constitutes conforming oneself to the norms of the field outlined by this previous research. The previously published research was, in turn, written in conformity with the norms established by previous research; this regression continues *ad infinitum.* We discuss the implications of this regressive conformity for research on "student engagement and learning needs" in the final section.

Another key article within Bubble 3 is Hackenberg's (2010) study on the caring relationships between a group of sixth-grade students and their teachers. This study seems to be placed in Bubble 3 through Dubbs (2021) citational cartography due to the grade-level of this article since much of the literature cited by Hackenberg is from *outside* the field of mathematics education research, and thus, does not tether it as tightly to *central* topics in the field. Hackenberg draws on Nel Noddings' care theory (2002) to unpack how students might *feel*, in relation with the teacher, while doing mathematics. Hackenberg ends her manuscript with the question, "How can the study of mathematical care and general care for students mutually inform each other?" (p. 268). Importantly, she suggests that MERs need to attend to the "broader canvas of the development of care theory, which includes theorizing about care in relation to assumptions founded on particular racial and cultural points of view" (p. 268). This suggestion is important for MERs, too, since student emotions intersect with student learning and engagement. The implications of Hackeberg's presence in Bubble 3 for "student engagement and learning needs" writ large are discussed in the last section.

The second focal bubble, Bubble 17 (Children's Achievement, Intervention, and Trajectories) is adjacent to Bubble 3 above. Both foci bubbles intersect with Bubble 29 (Learning Disabilities) which may indicate that when MERs engage in research related to children that the research is focused on deficits in children's mathematical learning. This is supported by the presence of "intervention" in the title of Bubble 17. Bubble 17 centers on preschool mathematics education and research on intervention. Specifically, Clements and Sarama (2011), an anchor in the bubble, considers the interventions available to support young children's opportunity to learn mathematics. While the research distinguishes differences in performance between low- and middle-income students and draws attention to differences in performance between African American children and "their peers" (p. 970) without naming any other races/ethnicities, the piece does not cite any research on race and mathematics.

In fact, both of the foci bubbles (3 and 17) related to "engagement and learning needs" are markedly distant from the bubbles related to race, gender, context, and social justice mathematics on the on the far right side of the map in Figure 2 (12-Culturally Relevant Mathematics African American and Indigenous; 13-Racial Identity & Success; 14-English Language Learner's Identity and Participation; 15-Achievement Gap; 33-Urban Equity and Technology's Role; 19-Equity and Social Justice; 21-Mathematical Identity; 27-Racialized Mathematics Achievement; 36-Girls' Identities; and 30-Learning in Context). While research in Bubbles 3 and 17 indicate deficits in learning, and in the case of Clements and Sarama (2011) imply that those deficits may be related to race and SES, they do not interact with the articles and authors thinking about race, gender, and other socio-political constructs in relation to mathematics education. This is one of two noteworthy gaps in the map. We revisit the implications for the gap between "student learning and engagement needs" and race, gender, and other socio-political constructs in the final section.

The second gap is to the left of Bubble 9 (Mathematics Knowledge for Teaching), between bubbles 29 (Learning Disabilities), 17 (Children's Achievement, Intervention, & Trajectories), and 25 (Algebra) on the left periphery, Bubble 3 at the top periphery, and 6 (Meaning of Equality) and 10 (Negative Numbers) at the bottom. This area of relative low density indicates that these bubbles are siloed from mathematics education writ large but adhere to themselves due to self- and intra-citing. These bubbles related to mathematical content (25, 6, 10) and teacher and student knowledge of mathematics (9, 29, 17) are separated by a gap. While there are some interconnections, this gap suggests that MREs are not integrating research on mathematics content with research on teacher knowledge and student learning and vice versa. We return to these, and the foreshadowed implications, now.

Implications and Future Directions

> Academic fields are made through our intra-actions with(in) them. As we test the borders and stray outside the perceived lines, the field is reconfigured, and new tracts are laid that might be followed. (Cannon, 2020b, p. 1116)

We began this paper by considering "What research agendas *are we pursuing* to ensure that all students reach their potential by paying attention to engagement and learning needs?" [RQ1]. To answer that question, we looked at the articles published in the *JRME* during the 2010s to discern the norms and foci of any relevant research. In this section, we turn to RQ2: "What research agendas should we pursue to ensure that all students reach their potential by paying attention to engagement and learning needs?" We now make two explicit recommendations on which agendas *ought* to be pursued based on the critical readings of the map outlined above: (1) make kin *within* mathematics education research, and (2) make kin *outside* mathematics education research. Haraway (2016), states, "the task is to make kin in lines of inventive connection …in myriad unfinished configurations of places, times, matters, meanings" (p. 1).

Radical Reimagining One: Making Kin within Mathematics Education Research

Our first suggestion for the field of mathematics education research is for MERs to make kin *within* the field. In other words, seek out opportunities for inventive connection within the extant research of the field. We illustrate the need and utility by revisiting our implications from above, in each case, illustrating the ways that making kin *within* is generative for a *becoming* field and *becoming* MERs.

First, revisiting the marginal position of Bubbles 3 (Children's Learning) and 17 (Children's Achievement, Intervention, and Trajectories) and their relative disconnect from the field, indicate opportunities to bring these ideas more centrally into focus. That is, the bubbles that focus squarely on the conference theme of "student learning and engagement needs" are positioned marginal to the field, as represented by the map of *JRME* 2010s. How is it that the field conducts research on, for example, mathematical discourse (Bubble 4) without considering the research within the focal bubbles? Is success constituted and measured differently? Are issues of learning needs and engagement largely absent?

Second, the implications of the gap between the focal bubbles and the bubbles on race, gender, and other socio-political constructs are significant. While mathematics research organizations and teacher organizations have been calling for equity to be centralized in mathematics education research (NCTM, 2014; TODOS: Mathematics for All, 2020), this map emphasizes the continued need to make explicit connections between research on learning needs, engagement, and interventions and the research on race, gender, sexuality, and other socio-political constructs. Is the field perpetuating color-blind ideology by way of color-blind research? How might thinking with

the excellent research in the equity bubbles inform Clements and Sarama's thinking about intervention? In sum, these findings and implications suggest that making kin *within* the field is a productive endeavor for MERs. In other words, by seeking opportunities for inventive connections *within* the extant research of the field, we can find new ways for a *becoming* field and as *becoming* MERs.

Radical Reimagining Two: Making Kin outside Mathematics Education Research

Our second suggestion for the field of mathematics education research is for MERs to make kin *outside* the field. In other words, seek out opportunities for inventive connection outside the field. We illustrate the need and utility by revisiting our implications from above to show the ways that making kin *outside* is generative for a *becoming* field and *becoming* MERs.

First, we revisit the implications of the regressive conformity implied by writing that seeks to conform to the norms of a field. Since new research is expected to conform to existing norms, there are limits on the types of research that can be done. For example, if norms draw on quantitative, qualitative, and mixed methods, there is excluded an entire humanities-oriented research tradition (e.g., philosophy, history, textual analysis; See AERA, 2009). Conformity to these norms, then, precludes truly novel methods and approaches to research. Additionally, if research foci are normatively dictated, there is limited agency to engage with new areas of research. In other words, norms not only limit our freedom in *becoming* MERs, but also limit the field's *becoming* since it limits the ways in which the field is free to grow. Therefore, we advocate for intentional norm transgression: draw on methods and theories outside the normative bounds of the field. Where will those methods and theories lead us? Or consider research foci outside the normative limits of what is sensible for the field. What can the field *become*?

Second, recall that Hackenberg's (2010) study using Nodding's (2002) notion of care to center emotions was included in Bubble 3 due to its (1) focus on sixth-grade students and the corresponding literature base similarly cited by other authors, and (2) relative lack of connections to the other bubbles of the *JRME*. Hackenberg's references largely fall outside the *JRME*, leaving it unmoored within the landscape of the *JRME* and pushed toward the margins. While Hackenberg's lack on connections within the field of mathematics education research may have distanced her work from the central areas of research within the field, her inclusion of Noddings' theory of care (2002) in her manuscript—an uncommon theory in mathematics education research—was a line of inventive connection that caused a field disruption (Cannon, 2020a). This connection *outside* the field, then, raises a series of important questions *within* the field: Are the children, tweens, teens, young-adults, and adults in our mathematics classes being cared for? Are the emotional needs of all students being attended to? If not, are there underlying assumptions about certain-aged students being able to self-regulate? What do these assumptions induce when applied to the learning needs and engagement of all students?

Parting Thoughts

Though the images of the maps are static, we acknowledge that the field of mathematics education is always being re/made, always *becoming*. We find hope in this. We map not to contain but to see how we got here and how we might want to find ways forward. The field is porous and open to rearrangements. We imagine a horizontal depth and moving across, knitting bubbles together until the field is more tightly woven, not to keep out, but to enmesh and bring into kinship (Haraway, 2016). We imagine a field so interconnected and entangled that individual bubbles are no longer legible: a field of MERs *becoming*.

References

American Educational Research Association. (2009). Standards for reporting on humanities-oriented research in AERA publications. *Educational Researcher*, *38*(6), 481–486. https://doi.org/10.3102/0013189X09341833

Barad, K. (2007). *Meeting the universe halfway: Quantum physics and the entanglement of matter and meaning*. Duke University Press.

Cannon, S. O. (2020a). A call for field disruptions and field connections in mathematics education research. *Journal of Urban Mathematics Education, 13*(2), 1–16. https://jume-ojs-tamu.tdl.org/jume/index.php/JUME/article/view/389/310

Cannon, S. O. (2020b). Field guide to academic becoming. *Qualitative Inquiry, 26*(8-9), 1110–1121. https://doi.org/10.1177/1077800419881658

Clements, D. H., & Sarama, J. (2011). Early childhood mathematics intervention. *Science, 333*(6045), 968–970.https://doi.org/10.1126/science.1204537

Dubbs, C. H. (2020). Whose ethics? Towards clarifying ethics in mathematics education research. *Journal of Philosophy of Education*. https://doi.org/10.1111/1467-9752.12427

Dubbs, C. H. (2021). *Mathematics education atlas: Mapping the field of mathematics education research*. Crave Press.

Fendler, L. (2014). *Michel Foucault*. Bloomsbury Publishing.

Foote, M. Q., & Bartell, T. G. (2011). Pathways to equity in mathematics education: How life experiences impact researcher positionality. *Educational Studies in Mathematics*, *78*(1), 45–68. https://doi.org/10.1007/s10649-011-9309-2

Foucault, M. (1984). The Ethics of the Concern for Self as a Practice of Freedom. In P. Rabinow (Ed.), *Ethics: Subjectivity and truth* (1997, pp. 253–80). The New Press.

Gutiérrez, R. (2013). The sociopolitical turn in mathematics education. *Journal for Research in Mathematics Education*, *44*(1), 37–68. https://doi.org/10.5951/jresematheduc.44.1.0037

Hackenberg, A. J. (2010). Mathematical caring relations in action. *Journal for Research in Mathematics Education*, *41*(3), 236–273. https://doi.org/10.5951/jresematheduc.41.3.0236

Haraway, D. (2016). *Staying with the trouble: Making kin in the Chthulucene*. Duke University Press.

Heid, M. K. (2010). Where's the math (in mathematics education research)? *Journal for Research in Mathematics Education*, *41*(2), 102–103. https://doi.org/10.5951/jresematheduc.41.2.0102

Herbst, P., Chazan, D., Crespo, S., Matthews, P. G., & Lichtenstein, E. K. (2022). How manuscripts can contribute to research on mathematics education: An expansive look at basic research in our field. *Journal for Research in Mathematics Education*, *53*(1), 2–9. https://doi.org/10.5951/jresematheduc-2021-0191

Hume, D. (1739) A Treatise of Human Nature. Available online at: https://ebooks.adelaide.edu.au/h/hume/david/h92t/B3.1.1.html.

Moore, K. C. (2014). Quantitative reasoning and the sine function: The case of Zac. *Journal for Research in Mathematics Education*, *45*(1), 102–138. https://doi.org/10.5951/jresematheduc.45.1.0102

NCTM. (2014). *Principles to actions: Ensuring mathematical success for all.* National Council of Teachers of Mathematics.

Nivens, R. A., & Otten, S. (2017). Assessing journal quality in mathematics education. *Journal for Research in Mathematics Education*, *48*(4), 348–368. https://doi.org/10.5951/jresematheduc.48.4.0348

Noddings, N. (2002). Educating moral people: A caring alternative to character education. Teachers College Press.

Norton & Wilkins, 2012, Norton, A., & Wilkins, J. L. (2012). The splitting group. *Journal for Research in Mathematics Education, 43*(5), 557–583. https://doi.org/10.5951/jresematheduc.43.5.0557

Wilkins, J. L., & Norton, A. (2018). Learning progression toward a measurement concept of fractions. *International Journal of STEM Education, 5*(1), 1–11. https://doi.org/10.1186/s40594-018-0119-2

Rancière, J. (2000). History and the Art System (interview with Yan Ciret). *Art Press*, *258*, 18–23.

Rancière, J. (2009). *The politics of aesthetics: The distribution of the sensible*. Bloomsbury Publishing.

Steffe, L. P. (2000). Perspectives on issues concerning the self, paideia, constraints and viability, and ethics. In L. P. Steffe & P. W. Thompson (Eds.), *Radical constructivism in action* (pp. 91–102). RoutledgeFalmer.

TODOS: Mathematics for All. (2020). The Mo(ve)ment to Prioritize Antiracist Mathematics: Planning for this and every school year. Tempe, AZ: Author. Available via https://todos-math/statements

Wilkins, J. L., & Norton, A. (2011). The splitting loope. *Journal for Research in Mathematics Education*, *42*(4), 386–416. https://doi.org/10.5951/jresematheduc.42.4.0386